



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1480
Alexandria, Virginia 22303-1480
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/586,773	07/21/2006	Tsuguhito Korenaga	10873.1921USWO	7858
53148 7590 02/25/2009 HAMRE, SCHUMANN, MUELLER & LARSON P.C. P.O. BOX 2902-0902 MINNEAPOLIS, MN 55402				
EXAMINER VILLECCO, JOHN M				
ART UNIT 2622		PAPER NUMBER		
MAIL DATE 02/25/2009		DELIVERY MODE PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.	Applicant(s)	
10/586,773	KORENAGA, TSUGUHIRO	
Examiner	Art Unit	
JOHN M. VILLECCO	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
 Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.135(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14 and 15 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other _____ |

DETAILED ACTION

Drawings

1. Figures 10, 11, and 12 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
 3. The disclosure is objected to because of the following informalities:
 - On page 3 of the specification, applicant makes reference to Japanese Publ. No. 2001-78217 A. On pages 4 and 5 of the specification, applicant makes reference to Japanese Publ. No. 2001-78127 A. It is not clear which is the correct Japanese Publication Number.
- Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1, 4, 5, 9, and 11, are rejected under 35 U.S.C. 102(b) as being anticipated by Murano (U.S. Patent No. 5,444,520).**

6. Regarding *claim 1*, Murano discloses an imaging device which makes the coefficient of thermal expansion of different parts equal to reduce distortion due to temperature. More specifically and as it relates to the applicant's claims, Murano discloses a lens holder (lens plate, 22) that holds the plurality of single lenses (lenses, 12), an imaging device holder (base plate, 2) that holds a plurality of imaging regions (CCD's, 4; col. 2, lines 33-47); wherein the lens holder (lens plate, 22) and the imaging device holder (base plate, 2) are disposed so as to be opposed to each other (Figures 5 and 6), the lens holder (lens plate, 22) comprises a member different from a member of the imaging device holder (base plate, 2; where they are different members), and a linear expansion coefficient of a material of the lens holder (lens plate, 22) is substantially equal to a linear expansion coefficient of a material of the imaging device holder (base plate, 2; col. 8, lines 43-50 and col. 9, lines 56-59), the materials of the lens holder (lens plate, 22) and the imaging device holder (base plate, 2) are different from a material of the plurality of single lenses (12; col. 7, lines 3-5 and col. 8, line 50 to col. 9, line 42). If a coefficient of thermal expansion is the same, the coefficient of linear thermal expansion is the same.

7. As for *claim 4*, Murano discloses a spacer (side walls, 8) between the lens holder (lens plate, 22) and the imaging device holder (base plate, 2).
8. With regard to *claim 5*, Murano discloses that the plurality of single lenses (12) are made of a resin so that the plurality of single lenses are independent and separated from one another. See column 7, lines 3-5.
9. Regarding *claim 9*, Murano discloses that the optical axes of the plurality of single lenses (12) are perpendicular to photoreceptive faces of the corresponding imaging regions, respectively, and pass substantially through centers of the corresponding imaging regions, respectively. See Figures 5 and 6.
10. As for *claim 11*, Murano discloses that the spacer (side walls, 8) prevents the imaging region from receiving light passing through the single lenses (12) other than the single lens corresponding to the imaging region. See Figure 5.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 1, 4, 5, 9, 11, 12, 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Publ. No. 2002/0089698) in view of Murano (U.S. Patent No. 5,444,520).**

13. Regarding *claim 1*, Inoue discloses an imaging apparatus which simultaneously captures a plurality of different corresponding regions and synthesizes them to form an image. More specifically and as it relates to the applicant's claims, Inoue discloses a camera module comprising a plurality of single lenses (image formation lenses, 1), wherein the plurality of single lenses form images of a subject (photogenic subject, 101) in the plurality of imaging regions (Figure 2), and electrical signals from the plurality of imaging regions are synthesized to obtain an image (paragraph 0033), the camera module comprising: a lens holder (substrate, 41) that holds the plurality of single lenses (1a), an imaging device holder (imaging device, 103) that holds the plurality of imaging regions, wherein the lens holder and the imaging device holder are disposed so as to be opposed to each other. See paragraphs 0050-0054.

While Inoue is concerned with using a material with a linear expansion coefficient that will not affect image quality, Inoue fails to specifically disclose that the material of lens holder and the imaging device holder have a linear expansion coefficient that the substantially equal or that the materials of the lens holder and the imaging device holder are different from a material of the plurality of single lenses. Murano, on the other hand, discloses that it is well known in the art to make a lens holder and an imaging device holder to have the same linear expansion coefficient in order to reduce the degradation in image formation performance due to temperature variation. More specifically, Murano discloses a lens holder (lens plate, 22) that holds the plurality of single lenses (lenses, 12), an imaging device holder (base plate, 2) that holds a plurality of imaging regions (CCD's, 4; col. 2, lines 33-47); wherein the lens holder (lens plate, 22) and the imaging device holder (base plate, 2) are disposed so as to be opposed to each other (Figures 5 and 6), the lens holder (lens plate, 22) comprises a member different from a

member of the imaging device holder (base plate, 2; where they are different members), and a linear expansion coefficient of a material of the lens holder (lens plate, 22) is substantially equal to a linear expansion coefficient of a material of the imaging device holder (base plate, 2; col. 8, lines 43-50 and col. 9, lines 56-59), the materials of the lens holder (lens plate, 22) and the imaging device holder (base plate, 2) are different from a material of the plurality of single lenses (12; col. 7, lines 3-5 and col. 8, line 50 to col. 9, line 42). Such an arrangement allows for the reduction of degradation in image formation performance due to temperature variation. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the imaging device of Inoue in a manner similar to Murano in order to reduce image degradation do to temperature variations.

14. As for *claim 4*, Murano discloses a spacer (side walls, 8) between the lens holder (lens plate, 22) and the imaging device holder (base plate, 2).

15. With regard to *claim 5*, Murano discloses that the plurality of single lenses (12) are made of a resin so that the plurality of single lenses are independent and separated from one another. See column 7, lines 3-5.

16. Regarding *claim 9*, Murano discloses that the optical axes of the plurality of single lenses (12) are perpendicular to photoreceptive faces of the corresponding imaging regions, respectively, and pass substantially through centers of the corresponding imaging regions, respectively. See Figures 5 and 6. Furthermore, Inoue discloses the same arrangement. See Figure 7.

17. As for *claim 11*, Murano discloses that the spacer (side walls, 8) prevents the imaging region from receiving light passing through the single lenses (12) other than the single lens corresponding to the imaging region. See Figure 5.

18. Regarding *claim 12*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. Additionally, Murano discloses that the side walls are coated with an anti-reflection layer. See column 7, line 68 to column 8, line 3. The aforementioned references however, fail to specifically disclose that the top and bottom surfaces are also coated with an anti-reflection layer. However, one of ordinary skill in the art would have found it obvious to also coat the top and bottom surfaces of the enclosure of Murano in order to eliminate stray reflections from those surfaces.

19. With regard to *claims 14*, Inoue discloses that the lenses (1a) can be formed by injection molding.

20. Regarding *claim 15*, Inoue discloses that the lenses can be made by optical hardening (of which UV curing is a form).

21. **Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Publ. No. 2002/0089698) in view of Murano (U.S. Patent No. 5,444,520) and further in view of Aratani et al. (U.S. Publ. No. 2002/0075450).**

22. Regarding *claim 2*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. The aforementioned references however, fail to specifically disclose that the distance to a subject is measured by comparing electrical signals from the plurality of imaging regions. Aratani, on the other hand, discloses a compound imaging

system in which comparisons between imaging areas are used to determine distance to a subject. More specifically paragraphs 0041-0049 disclose the process of comparing the output of imaging areas to one another to determine the distance to a subject. Therefore, it would have been obvious to one of ordinary skill in the art to use the output of the different areas of Inoue in order to determine the distance to a subject.

23. As for *claim 8*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. The aforementioned references however, fail to specifically disclose that each of the plurality of lenses comprises diffraction gratings on each side. Aratani, on the other hand, discloses that the optical blocks (3-1 to 3-16) include optical action surfaces that have diffraction surfaces on "at least one of the surfaces". Thus, Aratani discloses that the optical blocks can have diffraction surface on both surfaces. Such an arrangement corrects for chromatic aberrations. Therefore, it would have been obvious to one of ordinary skill in the art to include diffraction surfaces on both sides of the lenses of Inoue in order to correct for chromatic aberrations.

24. **Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Publ. No. 2002/0089698) in view of Murano (U.S. Patent No. 5,444,520) and further in view of Maeda et al. (U.S. Publ. No. 2004/0075761).**

25. Regarding *claim 3*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. The aforementioned references however, fail to specifically disclose that the lens holder and the imaging device holder are both made of silicon. While Inoue does disclose that the materials should be the same, he fails to disclose that

that material is silicon. Maeda, on the other hand, discloses that it is well known to make a substrate and support members of an imaging device out of silicon. Furthermore, Maeda does this in order to eliminate distortion due to differences in the thermal expansion coefficient. See paragraphs 0016-0018. Maeda discloses that the use of silicon reduces costs, distortion effects and lengthens life. See paragraph 0018. Therefore, it would have been obvious to one of ordinary skill in the art to make the lens holder and imaging device hole of Murano out of silicon.

26. **Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Publ. No. 2002/0089698) in view of Murano (U.S. Patent No. 5,444,520) and further in view of Ogura et al. (U.S. Publ. No. 2002/0020845).**

27. Regarding *claim 6*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. The aforementioned references however, fail to specifically disclose a plurality of color filters in one-to-one correspondence with the single lenses, wherein the color filters allow in red, green, and blue. Ogura, on the other hand, discloses that it is well known in the art to include color filters in a one-to-one correspondence with imaging regions and that those colors include red, green, and blue. See Figure 1. Such an arrangement allows for the capture of color images. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include color filters in a one-to-one correspondence with the imaging regions in the device of Inoue in order to capture a color image.

28. As for *claim 7*, Ogura discloses that two of color filters let in green light. See Figure 1.

29. **Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. (U.S. Publ. No. 2002/0089698) in view of Murano (U.S. Patent No. 5,444,520) and further in view of Cornelius et al. (U.S. Patent No. 5,442,167).**

30. Regarding *claim 10*, as mentioned above in the discussion of claim 1, Inoue and Murano disclose all of the limitations of the parent claim. The aforementioned references however, fail to specifically disclose detecting a focal position of the subject image, an actuator for changing the interval between the lens holder and the device holder, and a controller that controls the actuator in response to the detected focal position. While Inoue does hint at the ability to move the lenses in order to focus (paragraph 0053), he fails to specifically disclose the claimed structure. Cornelius, on the other hand, discloses just such an arrangement. More specifically, Cornelius discloses a detector (5) for detecting a distance to the subject, an actuator (9) that changes the distance between the lens and the imaging device, and a controller (7) for controlling the actuator in response to the detected distance. See column 4, lines 1-19. Such an arrangement allows for the proper focus of an image. See column 2, lines 35-42. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the arrangement for focusing of Cornelius in the imager of Inoue in order to capture a focused image of a subject.

Allowable Subject Matter

31. Claim 13 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

32. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 13, the primary reason for indication of allowable subject matter is that the prior art fails to teach or reasonably suggest that the coating comprises a single layer film with a refractive index of 2.1 and a thickness of 140 nm.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. VILLECCO whose telephone number is (571)272-7319. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JOHN M. VILLECCO/
Primary Examiner, Art Unit 2622
February 19, 2009